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ABSTRACT

The 10-volume "Health Facts" series is intended to supplement health education curricula and provide a handy reference for individuals who would like additional background information on particular health topics. The emphasis is placed on topics and examples relevant to youth of middle and high school age. The seven sections in this book on drug use prevention provide educators with basic facts about how drugs work, including specific information on a variety of drugs, such as tobacco, alcohol, and psychoactive drugs. The book includes discussion of drug dependence, addiction, and treatment; family and peer influences which lead to drug use; prevention and treatment; and the costs of drug use. An easy to read reference format offers clear, concise data intended to familiarize educators with the most important facts about the issues and concerns. A glossary and a list of resources complete the volume. (LL)

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Drug Use Prevention

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Drug Use Prevention

HEALTH FACTS

Lucas Stang

and

Kathleen R. Miner, PhD, MPH, CHES

ETR ASSOCIATES
Santa Cruz, California
1994

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ETR Associates (Education, Training and Research) is a nonprofit organization committed to fostering the health, well-being and cultural diversity of individuals, families, schools and communities. The publishing program of ETR Associates provides books and materials that empower young people and adults with the skills to make positive health choices. We invite health professionals to learn more about our high-quality publishing, training and research programs by contacting us at P.O. Box 1830, Santa Cruz, CA 95061-1830, 1-800-321-4407.

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Editor's Preface

Everyone agrees that children and youth need to learn skills for establishing good health habits. Most people also agree that the earlier health education starts, the better its success.

The books in the *Health Facts* series were written to provide the background information educators need as they teach young people about health. The information is provided in a way that makes it easy for educators to familiarize themselves quickly with the most important facts about a health topic.

Rather than providing indepth information in each content area, the books offer guidance to the balance of emphasis. They help educators approach health topics with confidence and focus health content as they teach.

Titles in the Series

Each volume in the series contains information about a different content area. The following ten books comprise the series:

- *Disease Prevention*
- *Drug Use Prevention*
- *Environmental and Community Health*
- *Fitness*
- *HIV Prevention*
- *Injury and Violence Prevention*
- *Mental and Emotional Health*
- *Nutrition*
- *Sexuality*
- *STD Prevention*

Contributors

These books were written by the following talented and knowledgeable professionals in collaboration with ETR Associates' staff.

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Lucas Stang has a background in biology and health, with graduate work in science communication. He has been writing health materials for ten years. He recently served as wellness coordinator for the International School in Manila, Philippines, where he developed a kindergarten through grade 12 health curriculum and taught high school health. He has also taught human sexuality at the junior college level.

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Rama Khalsa, PhD, is a clinical psychologist and the director of the Santa Cruz County Department of Mental Health in Santa Cruz, California.

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In addition, we would like to thank Mary Nelson, publisher of ETR Associates, for the concept idea, Kathleen Middleton, editor-in-chief of ETR Associates, for her review and conceptualization, and Jill Schettler for her help in editing.

Netha Thacker
Project Editor

Introduction

Slogans that teach young people to "Say no" to drugs or sex have a nice ring to them. But...they are as effective in prevention of adolescent pregnancy and drug abuse as the saying "Have a nice day" is in preventing clinical depression.

—Michael Carrera, EdD,
at the hearings of the
Presidential Commission on AIDS

As Michael Carrera's statement implies, the prevention of drug use is more complicated than designing media campaigns and coining catchy slogans. The use and abuse of consciousness-altering substances often goes deep into the fabric of a community.

In fact, the use of substances has been a reality during much of human existence. Ever since the first person ate a rotting, fermenting piece of fruit, alcohol has been a part of the human experience. Throughout history, shamans, medicine

men, priests and priestesses have used local plants and other concoctions to improve the sense of well-being, to induce stupor or to heighten spiritual awareness.

Today's society is not much different from these ancestors'. American society readily accepts the use of manufactured drugs or home-brewed tonics to relieve most common illnesses. Although most Americans do not use drugs to enhance their spirituality, they do not hesitate to take aspirin to relieve the pangs of headaches, swallow medicine to stop the sniffles, and spray decongestants to unplug sinuses. Along with the wide-scale acceptance of medicinal substances, most Americans accept the use of drugs as a part of recreation or to induce pleasure. Beer is consumed at ball games, wine is integrated into romantic dinners, and champagne is toasted at weddings and special ceremonies.

The question remains—where does substance use stop and substance abuse begin? The answer to this question is confounded by a number of factors. The biology of individuals can vary their ability to metabolize specific chemicals, which could affect their likelihood of developing dependency. The economy of a community can offer enormous incentives that encourage the sale of illegal substances. The diplomatic negotiations required to restrict the transport of drugs from one country to another involve political priorities, cultural differences and multinational agreements.

Ultimately, the answers to the drug use problem will involve wide-scale collaborative interventions. These interventions must acknowledge the social context of substance use and capitalize on the unique strengths of people and agencies that care about the problem, including the schools, the police, the courts, the sate and federal governments, and the people themselves.

Drug Use Prevention: Health Facts examines how drugs work and provides specific information on a variety of drugs, including tobacco and alcohol. It includes discussion of drug dependence, addiction and treatment; influences on drug use; and the costs of drug use.

The Role of Education

The research conducted during the past thirty years has offered greater insight into the causes of chronic disease, injury and violence. This research indicates that these conditions are primarily caused by human behavior. What people do or do not do places them at risk of acquiring chronic diseases or experiencing serious injuries.

The behavioral components associated with the modern pattern of disease and injury create the potential for preventing most of these health problems by changing behavior. Comprehensive health promotion and education programs provide the foundation for modern disease prevention.

Ideally, the health promotion and education process begins early. Early education provides the opportunity to reach children and youth before they begin to adopt the behaviors associated with chronic disease, sexually transmitted disease, drug use, injury and mental illness. Through a systematic review of health promotion and disease prevention, educators can help children and youth enhance their health while helping them avoid illness and injury.

The *Health Facts* Series

Drug Use Prevention: Health Facts is part of a ten-volume series designed to provide clear, concise content and to be complementary to curricula published by ETR Associates and other health education curricula. Other volumes in this series that relate to drug use prevention include *Mental and Emotional Health*, *Disease Prevention*, *STD Prevention*, *HIV Prevention*, *Injury and Violence Prevention* and *Fitness*.

Classroom teachers, counselors, school nurses and others are often called upon to become instant health educators. They may be asked to answer questions, present information and lead discussions on health topics in which they feel unprepared.

The *Health Facts* series is designed to be a handy reference for individuals who would like additional background information on particular health topics. The emphasis is on topics and examples that are relevant to youth of middle and high school age. References and resource listings direct the reader to additional relevant information. All of the volumes in this series offer a user-friendly format that is easy to read and factual.

The volumes discuss health and disease in straightforward language. Educators may want to review each volume for its appropriateness for their school and community before assigning the books for student use.

This book and the rest of the series can serve as useful additions to classroom, school or library collections. Health care professionals may choose individual volumes or the entire series as a convenient reference for patient education programs or as reading material in office waiting rooms. Individuals may find the series useful as a home reference as well.

WHAT ARE DRUGS?

MYTH: Drug use is a modern phenomenon.

Fact: Drug use has been common in all human societies. Plant remedies to treat and prevent disease have been used for thousands of years. Drugs known to alter the mind have long been an important part of many cultures' religious practices.

Drugs are chemical substances that have a direct effect on the structure or function of the body. A drug is any substance that causes a physical or mental change in the body. Drugs include medications available without a prescription, known as over-the-counter drugs; prescription medicines; caffeine; nicotine in tobacco; alcohol; and other drugs such as cocaine and heroin.

A *medicine* is a drug given for the purpose of diagnosis, treatment or prevention of disease. Medicines with very strong effects are available only with a written order, or *prescription*, from a physician. Other medicines can be purchased "*over-the-counter*" for self-medication.

For example, penicillin is a potent chemical that could easily be misused without professional guidance; therefore, a prescription is required. Topical antibiotic creams can be purchased over-the-counter for short-term treatment of minor skin problems. Both products are drugs because they affect how the body functions in the presence of an infection.

Any drug, even prescription and over-the-counter drugs, can be misused. Taking more than one drug at a time, including prescription and over-the-counter drugs, may have physiologic, behavioral and treatment effects. Drug interactions are complex, and caution should be used when combining drug treatments.

Some drugs alter mood and behavior. These are called *psychoactive* drugs. Some psychoactive drugs have little or no medicinal value and are used primarily for their mind-altering effects.

Brand Name Versus Generic

Every legal drug—prescription or over-the-counter—has three names:

- the formal chemical name, used almost exclusively by scientists
- the generic name, a shortened version of the chemical name
- the brand name, the name given to the drug by the company that markets it

Most new drugs are discovered by large pharmaceutical companies. Because drug development is so expensive and testing and approval take so long, companies are given a 17-year patent.

During this time the drug is usually sold under one brand name and may be very expensive. Once the patent expires, however, any drug company that meets FDA standards can manufacture and market the drug. These generic drugs usually cost much less than the brand-name version.

What Are Designer Drugs?

Some chemists alter both legal and illegal drugs and design chemicals that provide "highs." Designer drugs are untested, illegal chemicals produced in black market laboratories.

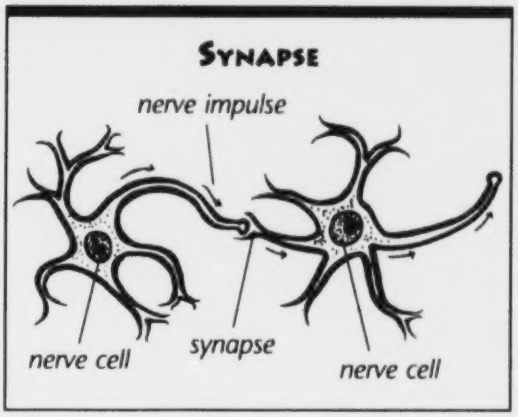
These drugs have become a major cause of dependence and of overdose deaths in the United States. Since their formulas are frequently changed, they are difficult for physicians to deal with in treatment or emergency care.

Some designer drugs popular in the past few years include:

- Ecstasy—the "love drug," produced from an amphetamine-like drug
- "China White"—a synthetic heroin
- PCP, or "angel dust"—derived from a veterinary anesthetic
- crack—a concentrated, smokable form of cocaine

How the Brain Works

An understanding of how the brain works provides a basis for understanding how drugs alter thinking and behavior. The brain is composed of cells. These brain cells, called *neurons*, send out long filaments that are entangled with each other in a complex web of connections. The filament of one neuron can communicate with any part of another neuron, but at each communication point there is an empty space called a *synapse*.



The space between neurons is called a synapse.

Put simply, brain cells communicate by electrical signals. A pulse of electricity travels the length of one neuron. Just before it reaches the synapse, it causes the cell to secrete a chemical messenger into the gap. This messenger, called a *neurotransmitter*, floats across the synapse and binds to a receptor on the other neuron's surface. These receptors are very specific. They are like biological "locks" into which the neurotransmitter "key" fits.

The binding begins a chemical reaction within the receiving cell that either excites it and makes it continue to transmit the electrical signal or inhibits it and stops the transmission. How the cell responds depends on the chemical messenger and which receptors respond to it.

The amount of neurotransmitter must also be regulated to prevent it from overstimulating the receptor. To prevent this problem, once the neurotransmitter has done its job, it either decomposes or is reabsorbed into the cell that originally secreted it.

This process seems simple, but in fact is very complicated. The human brain contains at least one hundred million synapses. There are more than thirty known neurotransmitters, and hundreds more may eventually be discovered. Some neurons respond to two or more neurotransmitters, and the sensitivity of the response can vary.

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How Drugs Act in the Brain

Drugs change the way neurons communicate. Each drug affects specific nerve cell interactions. Drugs are selective, changing some interactions while leaving others unaffected.

The chemical structure of a drug is related to the chemical composition of the cells on which the drug acts. The structure of a drug determines where and how it will exert its action in the body. Drugs work only on those parts of the nervous system with the right chemistry.

Sometimes the ability of a drug to interfere with communication is beneficial. General anesthetics, for example, render some portions of the brain incapable of receiving and transmitting information about pain, but the portions responsible for breathing and maintaining heartbeat are unaffected.

Some drugs enhance, rather than limit, communication. They increase the amount of information flow from one neuron to another. For example, treating a Parkinson patient with L-dopa restores some of the communication pathways destroyed by the disease. Neurons that had lost the ability to send messages can once again function with the drug.

An increase in activity is not always good, however. Cocaine alters the communication ability of target neurons. Unlike L-dopa, which targets abnormal cells, cocaine affects normal nerve cells, overstimulating them and causing impaired brain function.

Other types of drugs, particularly hallucinogens, misdirect communication so the user's brain interprets sensual information in an altered manner. For example, LSD causes the signals to be passed to cells that are not the normal targets. In other words, instead of sending a smell signal into the olfactory nerve cells, the signal stimulates the part of the brain that interprets taste sensations. That's why people high on LSD say they can "taste" smells or "see" sounds.

Drug Use and Pregnancy

Almost every drug used by a pregnant woman, whether swallowed, inhaled or injected, crosses the placental membrane and enters the fetal bloodstream. Many drugs are toxic to the fetus, especially in early pregnancy. They can cause a variety of birth defects, depending on how long the drug is used and how much of the drug is used. Even common drugs such as aspirin, antibiotics and birth control pills can affect the fetus.

Drugs such as cocaine, heroin, barbiturates and amphetamines can cause miscarriage, stillbirth and other problems, including:

- premature birth
- low birth weight
- respiratory diseases and disorders
- addiction and withdrawal symptoms in a newborn baby

Women who smoke during pregnancy have a greater risk of miscarriage, premature birth and complications during pregnancy and labor. The babies of women smokers often have low birth weights, which may result in children with the following problems:

- behavior problems
- lower intelligence
- poor motor skills
- delayed development

Alcohol use during pregnancy can cause severe physical, mental and behavioral problems, which are referred to as *fetal alcohol syndrome*. Possible effects include:

- alcohol addiction
- pre- and postnatal growth deficiencies
- underdeveloped brain and nervous system
- facial abnormalities, particularly affecting the eyes and nasal bridge
- heart diseases and disorders
- mental retardation
- irritability and hyperactivity
- learning disabilities

Drug Dependence and Addiction

The concept of addiction literally describes the compulsive use of narcotics, a certain type of drug. The term refers to the ability of narcotics such as morphine, codeine and heroin to produce tolerance and physical dependence with a clear pattern of withdrawal symptoms when the drug is discontinued.

Today, many drugs with many different characteristics and patterns of use produce tolerance, dependence and withdrawal symptoms. The classical term *addiction* can no longer be applied generally.

In 1964, the World Health Organization (WHO) recommended that the term *addiction* be replaced with *drug dependence*. WHO defined drug dependence as a state arising from the repeated administration of a drug on a periodic or continual basis. The characteristics of dependence vary according to the drug involved.

Drug dependence has several aspects, including:

- tolerance
- physical dependence
- psychological dependence
- withdrawal

■ **Tolerance:** Tolerance is a physiological phenomenon that requires an individual to use more and more of a drug to achieve the same effects. In other words, the user must increase the amount of the drug used as time goes on to feel the same effects.

As the amount of drug used increases, the body responds for a short time, then the effects diminish and disappear. Eventually, the drug user arrives at a very high level of use with a corresponding high level of tolerance.

Not all drugs induce tolerance. Marijuana users, for example, do not seem to need increasing amounts of marijuana to feel its effects. Unfortunately, some of the most dangerous drugs do induce tolerance. Users of alcohol, cocaine, heroin, PCP, nicotine and many other drugs need more and more of the drug to continue to feel the same effects.

- **Physical dependence:** When the body needs the drug to function, the user is *physically dependent.* Humans as a species have been very successful because they have the ability to adapt to changes in the environment. This trait developed through evolutionary processes as a means of ensuring survival.

  Some drugs, however, turn on this adaptive mechanism without conferring the benefit. In response to the drug, the body changes the way it functions. The brain now interprets the drug action as normal, not pleasurable. People who are physically dependent on drugs must use the drugs at a certain level just to prevent withdrawal symptoms.

- **Psychological dependence:** Other drugs trigger a psychological rather than physical adaptive response. People who are *psychologically dependent* on drugs rely on the drugs for their sense of well-being. They become convinced that the feeling they get from the drug is necessary for them to function. The drug is substituted for other sources of gratification.

- **Withdrawal:** When drug users have become physically or psychologically dependent on a drug and then stop taking it, their systems are thrown into crisis. Physical and psychological symptoms occur as the system tries desperately to compensate for the missing chemicals.

  The timing and severity of these withdrawal symptoms depend on the type of drug and the length of time it has been used. An alcoholic who stops drinking trembles and may develop *delirium tremens*, a syndrome that includes fever, seizures, hallucinations and sometimes death. Within hours of a missed injection, narcotics addicts become extremely ill and may feel that their skin is literally crawling with bugs. Smokers who stop using cigarettes become anxious, irritable and depressed.

Symptoms of Drug Dependence

The American Psychiatric Association classifies substance dependence or drug dependence as a mental disorder. Substance dependence is impaired control of the use of a psychoactive drug and continued use despite adverse consequences.

The following nine characteristic symptoms are the same across all classes of drugs. However, certain symptoms may be less relevant for certain drugs. Therefore, only three of the nine are required for a diagnosis of dependence.

- Someone takes a drug and uses it in larger amounts and for longer periods of time than intended.
- Someone admits that his or her substance use is excessive and has attempted to reduce or control it, but has been unable to do so because the drug is available. In some cases, the person may want to reduce or control his or her drug use, but has not attempted to do so.
- Someone spends a great deal of time trying to obtain the substance, using it and recovering from its adverse effects.
- Someone becomes intoxicated or experiences withdrawal sickness when she or he is expected to fulfill obligations of a role such as parent, employee or student.
- Someone reduces or avoids participation in important social, occupational or recreational activities because of substance use.
- Someone ignores the array of social, psychological and physical problems that occur as a result of high-dose, extended substance use, and continues to use the drug.
- Someone develops tolerance to the effects of the substance.
- Someone develops withdrawal sickness when he or she stops using the drug.
- Someone uses the substance to avoid or relieve unpleasant symptoms when withdrawal occurs.

Influences on Drug Use

A variety of factors affect the choices people make about drug use. Studies show that knowledge about drugs alone is not effective in reducing drug-taking behavior. Beliefs and attitudes have greater influence. Negative feelings about drug use correlate to much lower risk. A good deal of research has shown a relationship between drug-use behavior and the attitudes of family and friends.

Parents have great influence on their children. Positive, warm family relationships in which members are involved with and attached to each other discourage drug use. Conversely, parental use and tolerant attitudes toward drugs can encourage children's drug use.

Next to parents, peers can be the most powerful role models, especially for young people. A person will be more likely to try a drug if friends use it. Young people who are confident about their decision-making skills and able to communicate their decisions effectively to others are less likely to be influenced by peers or other pressures to use drugs.

An individual already using a drug is likely to introduce friends to the experience. There may be subtle or overt threats to participate or risk the friendship, an influence termed *negative peer pressure*. Association with drug users during adolescence is one of the strongest predictors of future drug use.

The wider social environment also plays a role in drug use. Community norms, school policies, access to substances, and local law enforcement all affect the potential for use. Media portrayals and advertising also shape public opinion and behavior. Much of the information in these messages is not accurate. Characters in films and television shows drink, smoke or use other substances with no apparent negative effects. Detective shows and movies may even make the drug trade seem exciting.

Selling involves persuading consumers to want a certain product and motivating them to buy it. The average American teenager sees about 1,000 alcohol ads each year.

What the Ads Really Say

Some experts claim that modern marketing teaches acceptance of and reliance on drugs. Commercials suggest that drug-taking is normal and necessary. The following messages are often found in advertisements for a variety of products.

- **Pain is unnecessary.** If you take a pill, pain will go away. The ads don't say that pain is an important signal from the body that something is wrong. People need to know why they hurt and how to treat the condition, not the symptom, properly.
- **You can feel great now.** The ads suggest that not only can pills relieve pain, but that drugs can make you feel youthful and energetic without consideration of exercise, diet and other health factors.
- **Drugs make parties fun.** Drinking is presented as a social requirement. Conversation, dancing, eating, playing games are not considered meaningful activities on their own.
- **After a hard day's work, you deserve to relax.** According to the ads, alcohol or caffeine will help you unwind. These ads ignore the fact that caffeine is a stimulant and that alcohol is a powerful depressant, not a mild relaxer.
- **Get a good night's sleep.** Ads suggest that a sleeping pill can help you get it. But insomnia can be the result of many medical conditions or drugs. Taking a sleeping pill doesn't solve the problem, it prolongs it.
- **Vitamins make kids grow and adults happier.** Many companies promote their vitamin products as the key to good health. Little is said about establishing a healthy eating pattern. Nor is the consumer reminded that vitamin deficiencies are rare among Americans who eat a reasonably nutritious diet.
- **Drugs can solve a weight problem.** This isn't true. The only way to control weight and maintain health is to eat properly and exercise.
- **Taking a drink is a good way to cope with stress.** Alcohol is not a positive coping mechanism. It doesn't solve problems, and the effects of intoxication increase the perception of stress.

- **Drinking makes people popular.** Alcohol does not make friends for anyone. It is not an answer to loneliness.
- **Athletes are better competitors if they drink beer.** The ads usually portray handsome athletes who give the impression they owe their success to their beer. Alcohol dulls coordination and has a decidedly negative effect on athletic skill.
- **Cosmetics can make you beautiful.** By definition, cosmetics that have the potential to change the way the body functions are drugs. Antiperspirants are drugs. Wrinkle creams and skin moisturizers are, too. While there are legitimate reasons for using these products, cosmetics cannot make people beautiful and desirable.

1-Minute Facts

- Drugs are chemical substances that directly affect the structure or function of the human body.
- Psychoactive drugs alter mood and behavior.
- An understanding of how the brain works provides a basis for understanding how drugs alter thinking and behavior.
- Drugs interfere with communication between brain cells.
- Almost every drug used by a pregnant woman crosses the placental membrane and enters the fetal bloodstream.
- Drug dependence is a state arising from the repeated administration of a drug on a periodic or continual basis. Aspects of dependence include tolerance, physical dependence, psychological dependence, and withdrawal.
- A variety of factors affect the choices people make about drug use.

TOBACCO

MYTH: Smoking isn't a drug problem.

Fact: Cigarettes contain nicotine, a powerful drug with both stimulant and depressant properties. Nicotine causes psychological as well as physical dependency. When a user stops smoking, unpleasant withdrawal symptoms occur within hours. High doses can result in nicotine poisoning.

Tobacco has been used by the Native peoples of the Americas for centuries as part of religious rituals and as a medicinal herb. They smoked it in pipes and used snuff, a smokeless tobacco. The plant was unknown in Europe, however, until Columbus returned from his voyage to the "New World."

Tobacco comes from various plants of the genus *Nicotiana*, which grow easily in mild climates. Both the tobacco plant and *nicotine*, its drug component, are named for Jean Nicot, a French ambassador to Portugal, who sent tobacco seeds to Paris in 1551.

By the 1600s, tobacco cultivation was flourishing in the American colonies. Tobacco became one of the principal New

World exports, satisfying a growing European demand. Tobacco became so valuable during the Revolutionary War that the leaves were used as currency.

Throughout the nineteenth century and the first two decades of the twentieth century, smokeless tobacco—chewing tobacco and snuff—was the predominant form used in the United States. People in all strata of society, including women, dipped snuff and chewed tobacco.

The need to spit, which was believed to spread disease, gradually led to a decline in the use of smokeless tobacco. The rolling machine, invented in 1881, could produce large numbers of cigarettes that came in handy packages and were easy to keep lit. By the 1920s, cigarettes had become the preferred choice of American tobacco enthusiasts.

Smoking continued to increase in popularity until the mid-1960s, when 42% of U.S. adults smoked. Then the Surgeon General released a report in 1964 that linked smoking with serious health risks such as lung cancer, heart disease and emphysema.

By the early 1990s, the number of smokers had declined to about one-quarter of all adults. However, smoking rates continued to rise among teenage girls, and more boys were using smokeless tobacco products.

What's in Tobacco Smoke?

Cigarettes, pipes and cigars are the major ways to smoke tobacco. All of these methods involve inhaling hot smoke, which contains the principal products of combusted tobacco, into the mouth and lungs. A burning cigarette releases more than 4,000 chemicals, including 43 that are known to cause cancer and 401 others that are toxic.

The following three ingredients are always present in tobacco smoke and are responsible for most smoking-related diseases:

- nicotine
- tar
- carbon monoxide

■ **Nicotine** is a powerful chemical found throughout the tobacco plant, but especially concentrated in the leaves. It is the chief addictive ingredient in the tobacco used in cigarettes, cigars and smokeless tobacco. Nicotine is a highly toxic poison.

Once nicotine is absorbed through the lungs, mouth and stomach, it enters all major body organ systems, tissues and fluids. It reaches the brain of a smoker in just eight seconds.

Nicotine is a very unusual drug because it has two different effects. When inhaled in short puffs, it has a stimulant effect, but when inhaled long and deeply, it has a tranquilizing effect. Smokers use the drug both to feel more energetic and to block stress.

Because nicotine is both a stimulant and a depressant drug, its psychological effects vary according to the individual and the setting. Some smokers report relaxation, while others become irritable and nervous.

Nicotine acts on all parts of the central nervous system. Its physical effects include:

- Heart rate and coronary blood flow increase.
- Blood vessels constrict, producing elevated blood pressure.
- Muscle tone increases.
- Activity in the gastrointestinal tract is heightened, which can lead to intestinal cramps and diarrhea.
- Oxygen consumption and respiration increase.
- Body temperature decreases.
- Bronchial tubes constrict.

At higher doses, the effects of nicotine include:

- dizziness
- faintness
- rapid pulse
- cold, clammy skin
- nausea, vomiting and diarrhea

In severe cases, the drug can cause convulsions, paralysis and death.

- **Tar:** Tobacco smoke includes millions of tiny particles. The high temperatures created in a burning cigarette cause the particulates to stick together, forming a gummy substance known as tar. The amount of tar varies among brands of cigarettes.

  Tar coats the surface of the smoker's lungs, which weakens the respiratory cilia. This weakness makes it difficult for smokers to clear debris and phlegm from the respiratory tract. The tars present in tobacco smoke are also known to cause cancer.

- **Carbon monoxide:** The carbon monoxide in cigarette smoke is the same gas that is present in a car's exhaust. It is highly toxic even in small doses.

  Carbon monoxide interferes with the ability of blood to carry oxygen, so smokers can't get enough oxygen. This effect is related to smokers' increased risk of heart attack and stroke. Combined with nicotine, carbon monoxide also contributes to a high risk of cardiovascular disease.

Smokeless Tobacco

Smokeless tobacco also contains nicotine. The nicotine in smokeless tobacco has adverse effects similar to those of cigarettes. Users have elevated blood nicotine levels. This elevation can cause a rise in blood pressure, heart rate and certain blood lipids, or fats.

Smokeless tobacco also contains a variety of cancer-causing agents. As the number of young men, women and even children who use smokeless tobacco has risen, so have cases of oral, head and neck cancer.

In a recent study sponsored by the National Institutes of Health, it was found that nonsmoking women who used snuff increased their risk of oral cancer fourfold. Another study of men showed the same increased risk.

The primary forms of smokeless tobacco are snuff and chewing tobacco.

- **Snuff** is cured ground tobacco sold in small, round tins. It comes in two basic forms: dry and moist.

  Dry snuff is inhaled through the nose, where the nicotine is absorbed through the mucous membranes. This type was popular in Europe a century ago, but is rarely used in the United States today.

  Use of moist snuff is common, particularly among male adolescents and young adults. A pinch or *cachet*, similar to a tea bag, of snuff powder is placed between the cheek and gum or between the teeth and lower lip. Moisture from saliva helps release the nicotine, which is absorbed through mucous membranes in the mouth.

- **Chewing tobacco** is made from coarsely cut leaves. It is packaged in plug, loose-leaf or twist varieties. Users don't actually chew these products. Rather, they clamp down on a golf-ball-sized wad with their teeth just hard enough to release the tobacco juices. As the juices mix with saliva, nicotine is absorbed through the membranes lining the mouth.

Why People Use Tobacco

People start smoking for many reasons:

- They are curious about it.
- Their friends or family members smoke.
- They are influenced by advertising.
- They think smoking will reduce stress.
- They think it will make them look sophisticated.
- They think it will make them look older.
- They think it will make them feel more attractive.

People keep smoking because they are addicted. Because nicotine is a highly addictive drug, tobacco use leads to both psychological and physical dependence.

Addiction and Withdrawal

Studies indicate that nicotine is one of the most addictive substances known, even more addictive than heroin or cocaine. A person who smokes a pack of cigarettes a day takes an estimated 7,000 puffs a year, a higher level of ingestion than any other drug.

Once absorbed, nicotine is metabolized by the liver in about thirty minutes, so users must replenish levels often. The initial sign of withdrawal is a craving to smoke. When nicotine is inhaled, the craving subsides.

A certain amount of nicotine must be inhaled in order to relieve the craving continually. If not, withdrawal symptoms, which can last for days, or even months, intensify. They may include:

- anxiety
- nausea
- headaches
- diarrhea

- constipation
- insomnia
- irritability
- inability to concentrate
- increase in appetite

Two types of withdrawal—physical and psychological—occur when a person stops smoking. Smokers are physically dependent on nicotine and psychologically dependent on the habit of smoking. Physical withdrawal is easier to deal with.

Smokeless tobacco is also addictive. Dependence and withdrawal symptoms from smokeless tobacco are the same as they are from cigarettes.

■ **Physical withdrawal** symptoms include:

- headache
- irritability
- muscle aches
- sleep disturbances
- tingling in the fingers
- craving tobacco

These symptoms are all related to the body's attempt to eliminate nicotine. The nicotine is eliminated over time by the kidneys, which flush the bloodstream. Drinking lots of water can help. Physical withdrawal symptoms peak in 24 to 48 hours.

■ **Psychological withdrawal** may last for weeks or years. Ex-smokers commonly report that they still crave the act of smoking and taste of tobacco. The first several months are usually the hardest and the most likely period during which a person will return to smoking.

Stopping for the long term is a continuous process that requires resolve, effort and positive reinforcement. However, studies indicate that many people who are not successful in their first attempt to quit smoking do succeed with repeated attempts.

The Influence of Tobacco Advertising

Cigarette manufacturers spend more than $3 billion annually to advertise and promote smoking. They spend more than $1 billion on billboard, magazine and other print ads. (Radio and television advertisements for tobacco have been illegal since 1 January 1971.)

The promotional spending of $2.2 billion includes money spent on the following activities:

- allowances paid to retailers for shelf space and positioning of products
- distribution of products imprinted with brand names
- endorsements and testimonials
- sponsorship of sports, music and other public entertainment, and cultural events
- free samples (annual spending totals $14 million)

Cigarette advertising rarely sells the product directly. Often smoking is not depicted at all. Except for the warning label required by the federal government, none of the negative effects of cigarettes are mentioned.

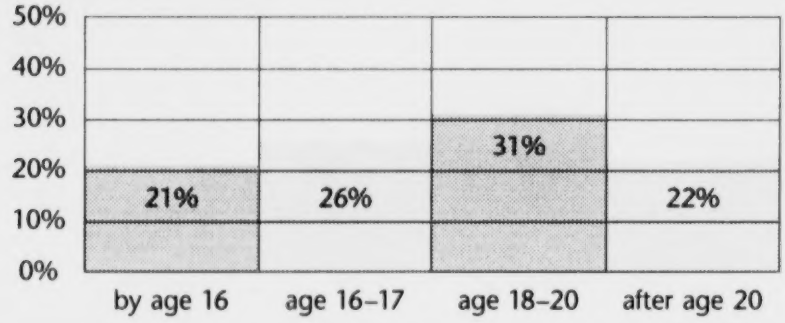
Tobacco ads emphasize positive themes such as sex, romance, adventure, wealth, fitness, friendship, success and elegance. Smokers are portrayed as happy, exciting, attractive people.

SMOKE-FREE SCHOOLS

A healthy school environment should not permit the use of tobacco products, either smoking or smokeless, by anyone—students, staff or family members—on school grounds or at school-sponsored events.

When Do People Start Smoking?

The following chart indicates at what age current smokers started smoking regularly.



Source: U.S. Department of Health and Human Services, Public Health Service. 1990. *Smoking and Health: A National Status Report.* 2d ed. DHHS Publication No. (CDC) 87-8396. Rockville, MD.

Environmental Tobacco Smoke

Environmental tobacco smoke (ETS), also called secondhand smoke, is the smoke from burning tobacco that goes into the environment. Any person who shares an environment with a smoker is subject to ETS.

ETS contains the same chemicals, at higher concentrations, as the smoke inhaled by the smoker. For example, ETS has eight times more carbon dioxide, two and half times more carbon monoxide and almost three times more nicotine than the smoke that the smoker inhales. The amount of particulates in tobacco smoke has led the U.S. Environmental Protection Agency to classify a poorly ventilated room or car as a hazardous environment.

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Nonsmokers in smoke-filled environments are sometimes called *passive smokers*. They experience a range of ill effects, including irritated eyes, nose and throat. Allergic reactions, including asthma, are common. Children of smoking parents have more respiratory problems, including bronchitis and pneumonia. Research has clearly demonstrated that involuntary smoking is a cause of disease—including heart disease and cancer—in healthy nonsmokers.

In 1992, more than 500 laws had been passed to regulate smoking and limit exposure to ETS. These laws created nonsmoking areas or eliminated smoking entirely in workplaces, public places, schools and restaurants. Regulations also made commercial airline flights in the United States smoke free.

Youth Stats

- The average age to begin smoking is 13.
- Four of five smokers develop the habit before age 21.
- It is illegal in 44 states and the District of Columbia to sell or advertise tobacco to minors.
- Each day, 3,000 teens start smoking.
- There are now 2.8 million smokers under age 18 who smoke more than 1 billion packs of cigarettes and spend more than $1.54 billion on cigarettes a year.

Health Risks of Smoking

More than 30,000 studies have been published on the relationship between smoking and disease. These studies indicate that the life expectancy for heavy smokers is an average of eight years less than for nonsmokers.

Former U.S. Surgeon General C. Everett Koop said, "Cigarette smoking is the chief, single, avoidable cause of death in our society and the most important health issue of our time." In the United States alone, deaths from smoking total more than 400,000 annually. This figure compares to 55,000 for automobile crashes and 3,150 from drug overdoses. Twenty percent of all funerals in the United States are for someone who has died prematurely of a tobacco-related disease.

Smokers are at increased risk for the following diseases:

- coronary heart disease
- lung disease
- cancer

■ **Coronary heart disease:** Smoking is the major cause of coronary heart disease in both men and women, responsible for approximately 120,000 deaths annually in the United States. Cigarette smoke also interacts with other known risk factors, such as excessive alcohol consumption, to compound individual risk.

Smokers have a 70% higher death rate from coronary heart disease than nonsmokers. Smokers who have smoked more than two packs a day have a 200% greater risk than nonsmokers.

■ **Lung disease:** Smoking is the major cause of chronic obstructive pulmonary disease in American adults. Nearly 80,000 Americans die each year from smoking-related respiratory problems. Heavy smokers have a thirty times greater risk of mortality than nonsmokers. Death usually occurs after an extended period of illness and disability.

- **Cancer:** Smoking causes cancers of the lung, larynx, oral cavity, pancreas, bladder and esophagus. In experiments on animals, cigarette tars painted on the skin result in the growth of cancerous tumors. Eighty percent of lung cancer deaths are directly attributable to smoking.

- **Other health problems:** Smoking is also linked to a variety of other chronic and acute health problems, including bronchitis, emphysema, sinusitis, peptic ulcers, influenza, hypertension and arteriosclerosis. The longer a person smokes, the higher the tar and nicotine content of the cigarettes, and the more smoke inhaled, the higher the rate of illness.

What Is Emphysema?

Emphysema is a lung condition characterized by shortness of breath. It is diagnosed when the air sacs in the lungs have become weakened and lose their elasticity.

Normally, these sacs, called *alveoli,* expand with each breath and then return to their normal small size between breaths. In emphysema, each sac is stretched out like a worn balloon. In addition to being stretched out, the weakened alveoli don't exchange carbon dioxide for oxygen properly.

Because the alveoli are not working, the respiratory muscles of the chest must work harder. Many emphysema sufferers have a barrel-chested appearance. Sufferers also lose weight and tire very easily.

There is no treatment for emphysema and no way to reverse the damage once it has begun. Stopping smoking, however, will prevent lung damage from progressing.

Financial Costs of Smoking

The financial costs of smoking are high. The annual total cost of smoking in the United States due to direct medical costs and indirect costs of lost productivity is estimated at $65 billion. Smokers in the United States lose an estimated 146 million workdays a year due to smoking-related diseases.

The extra cost of employing a smoker rather than a nonsmoker has been estimated at more than $5,000 a year. Compared to nonsmokers, smokers have an average 35% higher rate of absenteeism, cost approximately $300 more a year in insurance claims, and have twice the rate of job-related accidents.

Effects of Smoking on Social Life

Young people offer the following reasons for not dating smokers:

- They have bad breath.
- You can't get close to someone with a cigarette.
- It tastes bad to kiss them.
- They cough a lot.
- You have to breathe their smoke.
- Their hair and clothes smell.
- Their teeth are yellow.
- They have dirty-looking hands.
- It's not as much fun because smokers avoid physical activity; when they do something physical, they get tired too easily.

1-Minute Facts

- Tobacco comes from various plants of the genus *Nicotiana*, which grows easily in mild climates.
- Three ingredients that are always present in tobacco smoke are responsible for most smoking-related diseases: nicotine, tar and carbon monoxide.
- The nicotine in smokeless tobacco has adverse effects similar to those of cigarettes.
- Nicotine is even more addictive than heroin or cocaine.
- Environmental tobacco smoke contains the same chemicals, at higher concentrations, as the smoke inhaled by the smoker.
- The life expectancy for heavy smokers is an average of eight years less than for nonsmokers.
- Smokers are at increased risk for coronary heart disease, lung disease and cancer.
- The total annual cost of smoking in the United States is estimated at $65 billion.

ALCOHOL

MYTH: A little alcohol peps me up.

Fact: Alcohol is not a stimulant drug. It is a strong depressant with sedative properties.

Alcohol is the oldest and probably the most widely used drug. The process of fermentation was discovered by very early human hunter-gatherer societies. Through the years, various culture groups have made wines and beers, which were used in personal and social ceremonies.

Today, approximately two-thirds of American adults drink alcohol. About one-third of all Americans don't drink at all, a third drink moderately, and a third drink regularly. Among adolescents, slightly more than half of males and slightly less than half of females use alcohol, even though laws prohibit the sale or use of alcohol to anyone below the age of 21.

Although the majority of American adults do drink, many Americans feel ambivalent about drinking. Alcohol use is directly linked to many social and medical problems. Many drinkers themselves see alcohol as more harmful than good, more wrong than right.

This national ambivalence is reflected in the massive regulations on alcohol sales and distribution, which are intended to modify use. Today, there is a movement to promote responsible drinking and social support for abstinence.

Teen Drinking

Teenage use of alcohol is illegal in the United States, but many teenagers drink anyway. Studies show that 8 million adolescents use alcohol every week; about half a million binge, or drink five or more drinks in a row.

Two-thirds of high school seniors report that most or all of their friends drink alcohol; 32% said their friends get drunk at least once a week. Four and a half million young people (ages 15 to 24) are heavy drinkers.

Alcohol's effects are stronger in the body of a growing person than in an adult. The level of drinking that will cause liver cirrhosis in an adult in twenty years will have the same effect in a young person in less than one year.

A quarter of all fatal car crashes are caused by people under age 21 who have been drinking, and an estimated one in ten teen drinkers will become an alcoholic.

What Is Alcohol?

There are many varieties of alcohol. Ethyl, or grain, alcohol is the kind people drink in beverages. These beverages contain varying portions of the compound rather than pure alcohol.

Ethyl alcohol is formed by fermentation. This fermentation occurs when yeasts metabolize sugars in fruits, vegetables, grains and other foods to yield ethyl alcohol. The fermentation process continues until the alcohol level reaches approximately 14% alcohol by volume. At this level, the alcohol kills the yeast and fermentation ceases.

To make beverages with high alcohol content, fortification or distillation is used to increase the concentration of alcohol. Beverage labels indicate the alcohol concentration either by percentage or *proof*. Proof is twice the percentage of alcohol in a product. For example, 86 proof vodka is 43% alcohol by volume.

Wines are made from fermented fruits, berries, honey, milk, etc. They naturally contain between 8% and 12% alcohol; U.S. wines are often 14% alcohol. Vermouth and sweet wines are fortified up to 21% by adding more alcohol.

Beer is fermented from grains after the carbohydrate in them is converted to sugar. Beers contain 4% to 5% alcohol. Ales and malts are slightly stronger.

Spirits are made by further processing wines and beers. Because alcohol boils at a lower temperature, the beverage can be heated to separate the alcohol from other components. The vapor is moved into a collecting vessel, in which the gas recondenses to a liquid. By repeating the process, alcohol can be concentrated up to 100%. Vodka, gin, whiskies and other liquors average 40% to 50% alcohol.

EQUIVALENCE

A 12-ounce beer, a 5-ounce glass of wine, a 10-ounce wine cooler and 1½ ounces of liquor have the same amount of alcohol.

Effects on the Body

Alcohol does not require digestion in order to be absorbed into the bloodstream. Once alcohol is absorbed, it moves throughout the body. Alcohol is water-soluble rather than fat-soluble. Since women have proportionally more fat than men, they have less water in which to dilute the alcohol. Therefore, the alcohol concentration in women's tissues gets higher faster.

The body reacts to alcohol as a poison and begins breaking it down, or metabolizing it, to get it out of the system. Ninety-five percent of this work is done by the liver; the rest is accomplished in breath, urine and perspiration.

Alcohol metabolism occurs at a relatively stable rate in humans. It takes approximately one hour to eliminate a half ounce, or less than one average drink, of alcohol. If drinking has occurred at a faster rate, the rest of the toxin will stay in the blood and other organs, producing intoxication, until the liver can process it.

What's a Breathalyzer?

The breathalyzer has been a major weapon in the fight against drunk driving since 1980. The amount of alcohol in breath gives an accurate indication of the amount of alcohol circulating in the bloodstream. The breathalyzer measures the amount of alcohol in the air exhaled from the lungs. The machine then estimates the approximate concentration of alcohol in blood. In many states, concentrations between 0.08% and 0.1% or more are considered proof of intoxication. The trend is to lower the legal blood alcohol level to 0.08%.

Drinking small amounts of alcohol, even over a long period of time, does not have any permanent detrimental effects. For example, drinking a glass of wine with dinner is safe. But even a small amount of alcohol produces temporary disturbances to normal body function, including:

- The adrenal glands secrete hormones.
- Sugar stores in the liver are metabolized.
- Electrolyte balance is upset.
- Liver metabolism is disturbed.

As alcohol consumption increases, the effects on the body become more pronounced:

- Blood vessels dilate.
- Linings of the mouth, throat and stomach are irritated.
- Output of gastric secretions increases.
- The fluid within body cells is drawn out, causing dehydration.
- Body temperature decreases.
- Acute hepatitis (inflammation of the liver) may occur.
- Hangover symptoms (headache, nausea, stomach pains, thirst, generalized malaise, mental dullness) may last up to 24 hours while the body metabolizes the alcohol and detoxifies.

Long-term, chronic use of alcohol can cause extensive physical damage to nearly every body organ. Common problems include:

- stomach ulcers
- cirrhosis of the liver
- inability to digest food normally
- broken blood vessels
- damage to the tissues of the mouth, esophagus and stomach
- impaired heart muscle function
- brain injury

Blood Alcohol Concentration

The total ratio of alcohol to blood volume can be predicted based on a person's weight and the number of drinks consumed in an hour. This measurement, known as the Blood Alcohol Concentration (BAC), is related to the drug's behavioral and physiological effects. The BAC is used to determine legal limits for drunk driving.

Drinks	Blood Alcohol Concentration (BAC)							
1	.03	.03	.02	.02	.01	.01	.01	
2	.06	.05	.04	.04	.03	.03	.03	Sober
3	.10	.08	.06	.06	.05	.04	.04	
4	.13	.10	.09	.07	.06	.06	.05	
5	.16	.13	.11	.09	.08	.07	.06	
6	.19	.16	.13	.11	.10	.09	.08	Impaired
7	.22	.18	.15	.13	.11	.10	.09	
8	.26	.21	.17	.15	.13	.11	.10	
9	.29	.24	.19	.17	.14	.13	.12	
10	.33	.26	.22	.18	.16	.14	.13	Illegal*
11	.36	.29	.24	.20	.18	.16	.14	
12	.39	.31	.26	.22	.19	.17	.16	
	100	125	150	175	200	225	250	
	Body Weight (lbs.)							

*In some states, a BAC of 0.08% is illegal.
Source: Mothers Against Drunk Driving

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Effects on the Brain

Alcohol is a depressant drug in the same class with barbiturates, tranquilizers and anesthetics. At low concentrations, it can have a temporary stimulating quality because it suppresses the inhibition brain centers. As concentration increases, the effect is increasingly depressant.

The drug interferes first with the highest brain functions, those that control thinking, remembering, learning and making judgments. As depressant effects increase, these functions continue to deteriorate, as does more basic brain function.

Severe intoxication causes slurred speech, blurred vision, loss of balance, uncoordinated movements and mental confusion. At very high concentrations, alcohol destroys the brain's ability to maintain heartbeat, respiration and consciousness. Death occurs when blood alcohol content reaches approximately 0.6%.

As with other drugs, people drink to feel good. Small amounts of alcohol do lower anxiety and feelings of tension and increase feelings of exhilaration. The "good" feelings associated with this drug are part pharmacological and part learned. In other words, the drinker expects to feel good, which enhances the action of the drug.

As alcohol suppresses anxiety, the drinker becomes less inhibited socially. Quiet people become talkative; sexually repressed people become flirtatious; sometimes quiet people become verbally or physically aggressive. These reactions are due in part to the drug's effect on the drinker's brain and in part to the social acceptance of such drinking behavior.

BAC General Effects

Drinks in 1 hour	BAC	General Effects
1	.02–.03%	No overt effects, slight mood elevation
2	.05–.06%	Feelings of relaxation, warmth; slight increase in reaction time and decrease in fine muscle coordination
3	.08–.09%	Balance, vision, speech, hearing slightly impaired; feeling euphoric; confidence; loss of motor control; legal intoxication in some states
	.10%	**Legal intoxication in most states; some have lower limits**
4	.11–.12%	Coordination and balance becoming difficult; distinct impairment of mental facilities and judgment
5	.14–.15%	Major impairment of mental and physical control; slurred speech; blurred vision; lack of motor skills
7	.20%	Needs assistance to move about; mental confusion
10	.30%	Severe intoxication; minimal conscious control of mind and body functions
14	.40%	Unconsciousness; threshold of coma
17	.50%	Deep coma
20	.60%	Death from respiratory failure

Adapted from National Clearinghouse for Alcohol and Alcoholism Information.

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Alcohol and Disease Risks

Alcohol use takes a heavy health toll. The Centers for Disease Control and Prevention reported in 1985 that nearly 95,000 Americans died that year alone from alcohol-related injuries or disease. This represented 5% of all deaths from all causes for the study year.

When alcohol is absorbed, it is distributed throughout the body. Drinking for long periods of time in sufficient quantities can harm nearly every organ system in the body. Intake higher than two drinks a day is associated with increased risk for a variety of health problems, including:

- coronary heart disease
- cancer
- liver disease

■ **Coronary heart disease:** Moderate drinking appears to slightly reduce the risk of developing coronary disease. However, researchers suggest that this effect may be due to the general lifestyle patterns of moderate drinkers. These people are less likely to be highly competitive and aggressive and more likely than heavy drinkers to eat a balanced diet, exercise and rest properly.

Heavy drinking increases risk for coronary heart disease. Overuse of alcohol causes vitamin B1 deficiency, which leads to an enlarged heart and heart failure. The direct toxic effects of the drug weaken the heart muscle, causing scar tissue to build up between the small muscle fibers.

Alcohol and Driving Don't Mix

Alcohol has a detrimental effect on the skills required for safe driving. Even at low concentrations, BAC as low as 0.02% or 0.03%, alcohol impairs the driver's ability to react to danger quickly.

At a BAC of just 0.05%, which is generally within legal limits, reflex time is reduced by a quarter. Sharpness of vision is reduced by a third, having an effect similar to wearing sunglasses at night. The eyes move slowly and take longer to recover from headlight glare. A driver with a BAC of 0.05% is twice as likely to crash as a driver who has not been drinking. At 0.1% the risk is ten times greater; at 0.15%, 25 times greater.

According to the U.S. Department of Transportation, about 18,000 drunk drivers are killed each year. Most of these drivers are male; very few are wearing safety belts. About the same number of non-drivers are killed and a half million injured by drunk drivers.

Young drivers are at even greater risk and pose a greater risk to others. According to a 1988 study by the National Center for Health Statistics, the BAC levels in 16 to 19 year olds involved in fatal traffic crashes were much lower than in older drivers also involved in traffic fatalities. Alcohol may be more deadly in young people for the following reasons:

- Young people lack experience in compensating for the effects of alcohol.
- Young people have less driving skill, and their skills tend to deteriorate faster than those of older drivers, whose reactions are more automatic.
- Young people are especially likely to take risks, a tendency that is exacerbated by drinking.
- Young people tend to weigh less, therefore exaggerating the effects of small amounts of alcohol.

However, America's highways are getting safer. The media have helped focus attention on the problem of drunk driving, and schools have instituted alcohol education programs. Designated drivers, people who promise to abstain for the evening and provide safe transportation, can get free meals in some restaurants. Law enforcement agencies are making more arrests, and highway sobriety check points are now common. People are more aware than ever that drinking and driving don't mix.

- **Cancer:** Heavy drinkers have a greater risk of developing cancer and less chance of surviving it. Studies also show an increased risk of breast cancer among women who drink as little as three alcoholic beverages per week. How alcohol promotes cancer is not known, but as consumption goes up, so does the risk.

- **Liver disease:** Liver disease is the greatest risk of long-term alcohol use. Alcohol keeps the liver from breaking down fats as well as it should. The fats collect in the liver, even of moderate drinkers.

  Too much fat and alcohol cause the cells to die and scar tissue grows. Scarring of the liver is called *cirrhosis*. As scar tissue increases, liver function decreases until finally it can no longer function at all.

  Cirrhosis is one of the ten leading causes of death in the United States. It is the number one cause of death among alcoholics. Heavy drinkers are also prone to *alcohol hepatitis*, an inflammation of the liver caused by the toxic effects of alcohol.

Alcoholism

Alcohol use that continues in the face of adverse physical, mental, social or economic harm to the drinker has been recognized as a disease since ancient times. Today, alcoholism is defined as addiction to alcohol. The general term is used to describe the set of physical, psychological and social problems associated with drinking disease.

Alcoholics develop psychological dependence and physical dependence and experience withdrawal symptoms when they quit using the drug. The addiction is both a medical and psychological problem.

Experts name alcoholism as the single biggest medical problem facing our nation today. The cost of treatment for alcoholism and related disorders is nearly 15% of the national health bill, about $117 billion a year.

Nearly 18 million adults in this country are problem drinkers, and at least 12 million of them can be considered pre-alcoholics. Approximately 6 million have personal and health problems serious enough to cause them to be labeled alcoholics.

Stages of Alcoholism

The disease can be divided into three stages. Each stage may last for years and never progress to the next stage. The stages and their symptoms are

1. **Warning stage (pre-alcoholic and early alcoholic stages):**
   - increased tolerance to alcohol
   - drinking to escape from tension and frustration of daily living
   - preoccupation with drinking; surreptitious drinking
   - embarrassing behavior
   - blackouts (drinker has no recollection of events)

2. **Crucial stage:**
   - loss of control over the amount consumed (may not drink every day, but can't control alcohol consumption once drinking has begun)
   - conscious or subconscious guilt feelings about drinking
   - rationalization of drinking behavior ("good reasons" for drinking)
   - promises to stop drinking; may stop, but resumes
   - may still hold down a job or continue in school

3. **Chronic stage (true alcoholic phase and complete alcohol dependence):**
   - total dependence on alcohol
   - appearance, relationships, job performance deteriorate
   - periods of constant drinking (binge or bender)
   - can't stop after one drink
   - health consequences may intensify (liver and brain damage)
   - continued drinking necessary to prevent withdrawal and delirium tremens (DTs)
   - reverse tolerance (body needs smaller doses to feel the effects)

After several years in the chronic phase, symptoms may include delirium, muscle tremors, confusion and hallucinations. These symptoms may last from a few days to two weeks; death occurs in about 10% of cases.

ALCOHOLIC WITHDRAWAL

Delirium tremens, or DTs, is a form of mental illness, brought on by alcohol withdrawal, which causes the sufferer to lose touch with reality.

Causes of Alcoholism

There is no single known cause for alcoholism. Recent evidence suggests addicted drinkers may be genetically predisposed to develop the disease. Heredity may be responsible for an alcoholic gene, which turns on when alcohol is consumed, or alcoholics may be missing a protective genetic factor that prevents the development of alcoholic drinking behaviors.

Children of alcoholic parents may be more susceptible to alcoholism due to environmental factors that foster drinking behavior, such as dysfunctional family dynamics, easy availability of alcohol or peer pressure.

Advertising: A Potent Influence

The alcohol industry spends more than $1 billion a year on advertising. The advertising budget for one brand of beer (Budweiser) is more than the entire federal budget for research on alcoholism and alcohol abuse.

The predominant message of most alcohol advertising is that drinking is safe, healthy and makes users anything they want to be—happier, sexier, more sophisticated or successful. This message is found in the print media, movies, books, television, radio, concerts and sporting events.

The ads seem to indicate that everybody drinks, even though about one-third of American adults do not. Children and youth absorb this belief long before they are old enough to drink legally.

Treatment

There is no "magic bullet" for alcoholism. Studies show no clear-cut advantage to inpatient versus outpatient programs, residential or nonresidential settings, longer versus shorter programs, intensive or less intensive methods. Medical professionals believe that any treatment is better than no treatment.

Early intervention leads to the highest success rate, so it is important to seek help as soon as an alcohol-related problem is suspected. Patients who are likely to do well have jobs, stable families, no history of past treatment failures, minimal involvement with other drugs and minimal mental health problems.

Most experts believe that alcoholism is a lifelong disorder and that the only effective treatment is *abstinence*, refraining from the use of alcohol. Alcoholics Anonymous, a self-help group, offers long-term support to recovering alcoholics. Al-Anon and Alateen offer support to family members of alcoholics to help them cope with the effects of drinking on their families.

Helping Youth Avoid Alcohol

The following strategies can help youth stay away from alcohol.

- Don't allow children and youth to drink at home or in the homes of friends.
- Support alcohol education programs and school rules against alcohol use.
- Don't allow alcohol sales to minors.
- Talk to children and youth about why the laws protect them.
- Don't allow children and youth to see adults abusing alcohol.

1-Minute Facts

- Alcohol is the oldest and probably the most widely used drug.
- Alcohol is formed by fermentation that occurs when yeasts metabolize sugars in a variety of foods.
- Alcohol does not require digestion in order to be absorbed into the bloodstream, and it moves from there throughout the body.
- As alcohol consumption increases, the effects on the body become more pronounced.
- Alcohol is a depressant drug, which interferes with brain function.
- Alcohol intake greater than two drinks a day is associated with increased risk for a variety of health problems, including coronary heart disease, cancer and liver disease.
- The term *alcoholism* describes a set of physical, psychological and social problems associated with drinking alcohol.

Other Psychoactive Drugs

Myth: The effects of taking a stimulant drug can be counteracted by taking a depressant.

Fact: Although stimulants tend to excite people, and depressants tend to slow people down, drugs do not act as off/on switches. Each type of drug acts on the human body in unique and complex ways. Someone who takes a depressant drug and then feels sleepy cannot simply take a stimulant drug to return to a normal wide-awake state. The body will feel the simultaneous effects of both drugs.

Drugs can be classified by the ways in which they affect thinking and behavior. The following classifications are common:

- stimulants
- depressants
- narcotics
- hallucinogens
- inhalants
- marijuana

Stimulants

Stimulants are drugs that stimulate the central nervous system, affecting heart rate, blood pressure, pulse, body temperature and pupil size. They may interfere with muscle control and body movement and may cause loss of appetite. Users may feel depressed when they stop using these drugs.

Stimulant drugs include:

- caffeine
- amphetamine
- cocaine

Caffeine

Caffeine is probably the most widely used drug in the United States. The drug is found naturally in coffee, tea, kola nuts and chocolate. A cup of coffee contains about 100 milligrams of caffeine. A cup of tea averages about 40 milligrams of caffeine, although this varies depending on how the tea is brewed.

Caffeine is routinely added to other substances. For example, 95% of the caffeine in soft drinks is added by the manufacturer. Caffeine is an ingredient in many prescription and nonprescription drugs. It is used in alertness or stay-awake tablets, headache and pain relief medications, cold products and diuretics.

Caffeine's Effects

Caffeine causes increased rates of

- oxygen consumption
- heart rate
- metabolic rate
- blood vessel constriction and blood pressure
- stomach acid secretion
- urinary output

Caffeine also affects the part of the brain involved with fatigue and wakefulness. A dose as low as 100 milligrams results in feelings of alertness and well-being.

Caffeine may improve motor performance. Some tests show improvements in driving and typing skills and memory recall, for example. Much of this improvement may be accounted for by the increased wakefulness caffeine induces and may not really be the result of increased muscle control. Tasks requiring delicate muscular control or accurate timing may be impaired by caffeine use.

At doses of 500 milligrams, some people may experience insomnia, depression, irritability and anxiety. Doses twice as large can cause hallucinations and convulsions.

Caffeine is very useful in the treatment of migraine headaches. It is also used to treat barbiturate and morphine overdose because it can stimulate the respiratory system, which is depressed by those drugs.

The potent stimulating effects of caffeine and the other positive effects of the drug are responsible, at least in part, for the compulsion of many adults to consume coffee or other products containing caffeine. Regular users experience mild withdrawal symptoms, including irritability and sleepiness.

Amphetamine

Amphetamines are a group of synthetic drugs that cause increased brain activity. They are known by the following names:

- bennies
- Black Beauty
- crank
- crystal
- dex
- diet pills
- footballs
- goofballs
- meth
- methadrine
- pep pills
- speed
- truck drivers
- uppers

Amphetamines do not occur in nature. During World War II, amphetamine was given to U.S. soldiers. When these soldiers got home, word of the drug's invigorating character spread across the country.

In the 1950s, millions of people used amphetamines. The drugs were marketed for treatment of obesity, hyperactivity and depression. However, most people used amphetamines to increase energy, forego sleep and elevate mood.

Amphetamine is still used to treat obesity, but not very often. After two to three weeks, these medications begin to lose their effectiveness as appetite suppressants.

Amphetamines are also used to treat *narcolepsy*, a disease that causes uncontrolled sleepiness. Amphetamines can control many of the symptoms, but they cannot be used for long periods because users develop tolerance.

Today, the most common use of amphetamines is to treat hyperactive children. When these children take amphetamines, their activity slows down. Why amphetamines affect hyperactive children in this way is unknown. The drugs may selectively stimulate parts of the brain that ordinarily provide control of activity.

Amphetamine's Effects

When amphetamine comes in contact with brain cells, it causes them to release an excess of the neurotransmitters *adrenalin* and *dopamine*. Amphetamine increases physical activity and produces restlessness.

The brain responds to amphetamine with increased euphoria, alertness, self-esteem and confidence. Students who use the drug to study feel great about their upcoming test, but their performance is generally less than expected. While completing any task under the influence of the drug, mental performance actually decreases, while the perception of performance is enhanced.

Amphetamine causes users to talk more than usual. They may talk about many different and odd topics so quickly it is difficult to understand the words.

Amphetamine can make a tired person feel more alert, but only for a short time. Eventually, users become fatigued, despite the amphetamine, and judgment is grossly impaired as well.

Amphetamine also causes blood pressure to increase because it constricts blood vessels. It can cause the heart to beat faster and with more force. High doses can permanently injure blood vessels in the brain.

Other physical effects include:

- increased body temperature
- irregular heartbeat
- dilation of the pupils
- blurred vision
- weight loss
- dry mouth
- headache
- nausea and vomiting
- decreased pain sensitivity

Tolerance develops quickly with amphetamine. Users must use more and more of the drug to feel its effects. As tolerance increases, so does psychological dependence. Physical dependence also develops. Withdrawal symptoms vary from mildly unpleasant to extreme behavioral and physiological disruptions. General symptoms include sleepiness that persists for weeks, acute depression, and apathy.

Sometimes people who use amphetamines will begin using alcohol, barbiturates or other depressants to counteract the stimulant effects. The potential for drug interactions and overdoses is high, as is the potential for addiction to the depressants.

Cocaine

Cocaine is a drug derived from a plant that grows naturally in areas of South America, especially Peru. It is cultivated in other regions with similar soil and climate.

In the fifteenth century, European explorers discovered that American natives chewed the leaves of this plant. The Indians believed the plant was a gift from the gods and legend linked it to sexual prowess and fertility.

The Spanish conquerors brought tales of this wonder plant back to Europe, which was teetering on the brink of the scientific age. European botanists began to study the coca plant. Nearly 300 years would pass before interest in coca began to focus on the plant's drug effects.

By the middle of the nineteenth century, coca was an ingredient in many tonics and medication. Coca patent medicines were used to treat venereal disease, dysentery, narcotic addiction and alcoholism.

With the identification of cocaine as the active ingredient in these medicines, cocaine became a wonder drug, purported to cure, or at least manage, nearly every human illness. Reports of undesirable side-effects surfaced almost immediately, but were ignored.

Sigmund Freud, the father of psychiatry and psychoanalysis, was an important advocate for cocaine. He used the drug himself to relieve depression and wrote several articles encouraging other physicians to try it. Freud and a colleague, Carl Koller, can be credited with the discovery of cocaine's one valid medical use as a local anesthetic. Cocaine can be legally used as a local surgical anesthetic, particularly for eye procedures.

At the turn of the twentieth century, preparations containing codeine, morphine, opium and cocaine were not regulated by law. They were widely available and many people used them. Cocaine appeared in "tonics" hawked by famous personalities of the era. These tonics were used to treat a variety of conditions. Although they may have alleviated symptoms, they didn't provide cures.

As cocaine use spread throughout the general population, newspapers began to report on the horrors of dependency, and the government stepped in to control the drug. In 1914, the federal government, mistakenly classifying cocaine as a narcotic, outlawed its use without a prescription in the 1914 Harrison Narcotic Act.

The problem of cocaine use in the United States grew from 5.4 million people reported to have tried cocaine at least once in 1974 to an estimated 30 million people who had tried it in 1989. Although better education and treatment programs have helped decrease the number of users, cocaine remains one of the biggest medical, social, political and economic problems in the United States.

Cocaine is also known as

- snow
- coke
- freebase
- crack
- blow
- blizzard
- lines
- nose candy

Cocaine is produced by leaching the chemical out of the leaves with a solvent such as alcohol. Further treatment results in a product that is about 60% pure cocaine. This form is potent but will not dissolve in water or blood.

The drug must be treated again with oxidizing agents and acids, which yields cocaine that is water soluble and 99% pure. The white crystalline powder is a very stable salt that can be inhaled through the nose or mixed in solution and injected. This form is very concentrated with a high potential for dependency.

Today there are two other forms of cocaine with even greater ability to invoke dependence:

- freebase
- crack

- **Freebase** is made by releasing the natural form, or base, of cocaine. This can be smoked, which gets large amounts of drug to the brain quickly. Making freebase is dangerous because combustible chemicals are required. All traces must be removed or the material can literally blow up.

- **Crack** is a cheap means of obtaining smokable cocaine. Treating powdered cocaine with baking soda and water yields small rocks of a smokable substance with all the kick of freebase without the fire hazard.

All smokable forms of cocaine provide a maximum amount of drug in a minimum amount of time. Crack and freebase give higher highs followed by lower lows than even intravenous injection. Both are highly addictive.

Cocaine's Effects

Cocaine overstimulates the pleasure centers in the brain with an abundance of *dopamine*, a naturally occurring brain chemical that allows humans to interpret some activity or sensation as pleasurable. The brain interprets this as "something good going on" but also tells the user to "keep it up," leading to addiction.

Most of the behavioral effects of cocaine fall into the following categories.

- Changes in arousal: Users get a burst of energy. They feel as if their physical and mental powers are increased.
- Changes in mood: Cocaine causes feelings of well-being. Users feel energized, but relaxed and happy.

Cocaine poisoning can produce psychosis. Symptoms can include hallucinations and delusions serious enough to require hospitalization. Many users in the throes of a psychotic episode believe bugs are crawling on and under their skin and try to dig them out. As the body rids itself of the toxic substance, the symptoms eventually subside.

Cocaine can cause fatal heart attacks. Cocaine use can interfere with normal heart rhythms and increase blood pres-

sure. It can also cause an abnormally high heart rate, heart spasm, constricted blood vessels, and even blood clots. These conditions can lead to a blocked coronary artery—and a heart attack—even in a young, previously healthy person who has no history of heart disease.

Coke Stats

- There are an estimated 5 to 6 million regular users of cocaine in the United States.
- About 21 million Americans have tried the drug at least once.
- About 2.5 million people have tried crack at least once.
- Drug abuse deaths related to cocaine doubled between 1986 and 1989.
- In 1989, federal agencies seized nearly 200,000 pounds of cocaine, 15 times more than in a comparable time period in 1982.

Cocaine use also increases the incidence of strokes and psychiatric difficulties. The neurological problems may be catastrophic, such as seizures and strokes, and may occur without warning.

While the physical dependence on cocaine is less dramatic than with heroin and other drugs classified as opiates, the psychological dependence is severe. This psychological dependence leads to withdrawal symptoms that can affect both mind and body.

The most common and most serious symptom is depression, but muscle tremors, severe headache, ravenous hunger and a change in sleep patterns are also frequent. The symptoms of withdrawal usually begin rapidly, within 24 to 48 hours after the last use of cocaine, and they can continue for as long as seven days.

Depressants

Depressants are drugs that tend to slow down certain body functions, including heart rate, blood pressure and breathing, and reaction time. At low doses, they reduce tension and anxiety. At higher doses, they produce drowsiness and can be used to induce sleep. At even higher doses, some depressants can cause deep unconsciousness sufficient to make them useful as general anesthetics.

Depressants selectively reduce activity in the central nervous system. Thus, they have a calming, sleep-producing effect. Depressants such as *barbiturates* are used as *tranquilizers*.

Other common names for depressant drugs include:

- sleeping pills
- downers
- knock-out drops
- seconal—white powder in a red or pink capsule, also called reds, red devils, pink ladies
- tuinal—white powder in a red and blue capsule, called rainbows or reds and blues
- nembutal—white powder in a yellow capsule, called yellows or yellow jackets
- amytal—white powder in a blue capsule, called blues or blue heavens
- Valium
- Librium
- Tranxene
- Xanax

Depressants' Effects

Depressants act on the parts of the brain involved in inhibitory or restraining mechanisms of behavior. Users feel calmer and more in control. They may become more talkative and uninhibited.

The physical effects of barbiturates are very similar to alcohol. Blood vessels dilate, coordination is impaired, and reflexes are slowed. At very high doses, respiration can slow or stop; the user can lose consciousness and may die.

The most common side-effect of these drugs is sleepiness, and higher doses are used to exploit just this effect. Some elderly people have memory difficulties and confusion. Even younger people sometimes complain they cannot remember what has happened since they took the drug. Occasionally, barbiturates can cause nervousness, anxiety, nausea, diarrhea, euphoria and delirium.

Barbiturates are addicting and induce tolerance quickly. Overdose is common; barbiturate overdose is the most common method of suicide. Withdrawal from barbiturates is more dangerous than heroin withdrawal, and can be fatal.

The symptoms of withdrawal, many of which are the same as those of chronic alcoholism, can include:

- nervousness
- delirium
- confusion
- hallucinations
- convulsions
- unconsciousness

Because of the serious nature of the drug dependency and danger from withdrawal, barbiturates have been replaced by safer depressants to treat anxiety and sleep disorders in psychiatric practice.

Narcotics

Narcotics are drugs that act on the central nervous system to relieve pain, their *analgesic* function. They also provide a sense of well-being because they reduce the suffering, worry, fear and panic associated with pain.

All narcotics affect the brain in two ways. First, the drug blocks the transmission of nerve signals that usually stimulate the sympathetic nervous system, the network that controls how the body reacts to the environment. For example, normally a fearful situation causes the heart to beat faster, supplying oxygen and energy for some action to confront or avoid whatever is feared. This is an automatic reaction; it occurs without thought. Under the influence of narcotics, the brain doesn't perceive the same circumstances as fear producing.

Secondly, narcotics increase nerve signals in the brain's pleasure centers. The drug user's brain not only fails to perceive environmental cues normally, but also sends chemical signals that say "everything is good." This is how narcotics override pain, the usual indication that something is terribly wrong.

In general, narcotic use leads to tolerance and strong physical dependence. Narcotics are highly addicting.

All natural narcotics are derived from the *opium* poppy, a plant that grows naturally throughout Asia. When the poppy's unripe seed pod is slit, a milky white liquid oozes out and turns reddish-brown on contact with the air. The substance is dried and then smoked to obtain its effects.

Synthetic narcotics are produced in the laboratory. The best known are Demerol and Methadone. Both Demerol and Methadone are addictive. Demerol is the most widely used drug for severe pain, and can be given by pill or injected.

Methadone, administered orally, is similar to morphine, but its effects develop more slowly and last longer. Methadone is used as a substitute for heroin in treating narcotic addiction, even though it is also addictive.

Some analgesic drugs are made by modifying chemicals found in opium. *Dilaudid*, referred to as "drug store heroin," is the best known. *Percodan* and other drugs prescribed for control of moderate to severe pain are often abused as street drugs.

Natural narcotics include:

- morphine
- codeine
- heroin

Morphine

Opium base can be refined by a simple process to yield morphine, which is three times stronger than opium. Morphine is used legally in hospitals to control severe pain. The drug is injected directly into a vein and can cause the patient to lose consciousness.

Codeine

Codeine, another natural derivative of opium, is obtained from morphine, but it is only one-sixth as potent. Some prescription pain relievers contain codeine, as do prescription cough syrups.

Heroin

Heroin was developed from morphine by the Bayer Company in 1898, a year before aspirin was introduced. Scientists had hoped to find a less-addicting drug with which to treat painful diseases.

Heroin is ten times more potent than morphine, but it is also more addicting. It is not used today for any legitimate medical purpose. This drug can be smoked or snorted, but it is usually injected.

Heroin is also known by the following names:

- horse
- smack
- junk
- H
- Mexican brown
- China white

Pure heroin is a white powder with a bitter taste. The forms that are generally available to drug users come in a variety of colors due to impurities from the manufacturing process or the presence of other ingredients used to dilute the drug. Cutting agents such as lactose, brown sugar, quinine and baking soda are commonly used to dilute the drug for sale to users.

The heroin sold on the street is generally about 2% to 5% pure. The leading cause of overdose is the unwitting use of a mixture with higher purity.

Heroin is usually injected directly into an exposed vein. It can be inhaled or smoked, but most users prefer injection because more of the drug is absorbed directly from the bloodstream into the brain.

Heroin's Effects

Heroin produces a deep, dreamlike state of relaxation and contentment. Users have poor concentration and attention. Unlike the stereotype of a crazed addict, heroin "junkies" are typically very passive. The drug also has the following effects:

- suppresses hunger
- suppresses sex drive
- suppresses aggression
- induces sleep

Heroin affects almost all body systems because it acts at the brain centers that control them. Physical effects include:

- Pupils constrict.
- Respiration slows.
- Heartbeat slows.
- Gastrointestinal activity is reduced, which produces constipation.
- Urinary output is reduced.
- The cough reflex is suppressed.
- The muscular walls of the blood vessels relax, which causes an increased flow of blood to the skin and a slight drop in blood pressure.
- Body temperature drops, but the user will feel warm and may perspire.

Heroin addiction is expensive. Addicts often engage in illegal activities to get money to buy drugs. It is estimated that about a million heroin addicts live in the United States. Currently, treatment is available to less than a quarter of these addicts.

Addicts must inject themselves two to six times a day to avoid the discomfort of withdrawal, which is very intense for up to four days, with a decrease in symptoms as additional time passes. Some symptoms can persist for as long as ten weeks.

The Risks of Using Injection Drugs

People who use needles to inject drugs are at risk for developing a variety of diseases directly linked to injection drug use. One of the most common is soft tissue infection, usually at the site of injection. Other systemic illnesses may develop that can result in death.

Lung abscesses, tuberculosis and pneumonia are other serious infections of narcotic addicts. These diseases can occur with acute overdose, injection of talc, or from drug-induced stupor or coma. In many cases, there are complicating bronchial infections. Poor dental hygiene, common in addicts, also contributes to disease.

Needle users are a prime target for blood-borne diseases such as HIV infection and hepatitis because they often share contaminated injection equipment. One-fourth of all AIDS patients are drug users who have no other risk factors for the disease.

The withdrawal syndrome begins when the addict begins to crave more drug, usually four to six hours after the last dose. Eight to ten hours after the last dose, the user experiences:

- nervousness
- perspiration
- watery eyes and runny nose
- yawning
- itching
- craving for sweets

During the next 36 hours, additional symptoms develop:

- restlessness and irritability
- loss of appetite
- muscle aches and pains
- tremors
- dilated pupils

Withdrawal peaks at 48 to 72 hours after the last dose, with all of the preceding symptoms plus the following:

- insomnia
- abdominal cramps and diarrhea
- nausea and vomiting
- hot and cold flashes
- rapid heartbeat and respiration
- elevated blood pressure
- sneezing and cold symptoms

Overdose is relatively common among users, mostly from injecting unusually pure heroin. This causes acute respiratory depression, which can deepen into coma and death.

Hallucinogens

Hallucinogens are drugs that alter brain chemistry to bring on symptoms that might normally be described as psychotic. They are used to alter the perception of everyday reality, to cause *hallucinations*.

Many substances, both natural and synthetic, can alter perception. Native Americans have used mushrooms and peyote for thousands of years to create mystical or religious experiences. Many plants and seeds contain chemicals that can cause *psychedelic*, or mind-altering, effects.

Two of the most common hallucinogens are LSD and PCP.

LSD (Lysergic Acid Diethylamide)

LSD in its pure form is an odorless, colorless, tasteless crystal. It is the most powerful drug known. The average dose—about 35 to 50 micrograms—is so small it can't be seen by the naked eye. The drug acts within thirty to sixty minutes and its effects last eight to ten hours; occasionally they persist for several days.

The drug can be mixed with or put on almost anything that can be swallowed. It has been placed on sugar cubes, in capsules, tablets, in gelatin and on paper.

The most common street form is "blotter paper acid," in which the LSD is mixed with a volatile liquid and a drop is applied to a piece of paper smaller than a postage stamp. This is one "hit," which sells for about $5 on the street.

LSD use became popular in the 1960s, and, in fact, was not illegal in the United States until 1965. Harvard psychologist Timothy Leary and San Francisco author Ken Kesey were well-known proponents of using LSD to attain altered reality. Many people from all strata of society experimented with the drug.

As stories about the negative effects of LSD began to surface, use began to decline. A national study of college students in 1987 found that only 3.6% had used LSD in the preceding year.

LSD is also known by the following names:

- acid
- electric kool-aid
- blotter
- barrels
- microdot
- sunshine
- window pane

LSD's Effects

LSD and other psychedelics, including mescaline, psilocybin, and psilocin, achieve their effects by blocking the action of certain neurotransmitters. Even though LSD is a powerful drug, its physical effects are not large. It causes physiological responses similar to any central nervous system stimulant, including:

- slight increase in blood pressure
- increased heart rate
- slight rise in temperature
- increase in digestive activity that may result in nausea
- increase in salivation, perspiration and tear production
- dilated pupils
- excitation of the sympathetic nervous system, causing faster reflexes and muscular twitching or tremors

LSD produces many deviations from normal behavior. In fact, users regard their experience as totally removed from anything they have encountered in everyday life. The effects are highly subjective and vary from person to person and from one use of the drug to the next.

Most users report they are flooded with visual stimulation whether their eyes are open or closed. Light is intensified and colors are vivid. The drug may produce actual hallucinations, but more often users experience illusions, or distortions of actual stimuli. For example, walls seem to move or lights seem to prism into many colors.

LSD can produce an effect known as *synesthesia*, in which sensory messages in the brain seem to become crossed—sounds are seen, smells are heard, or colors are felt. There is also an alteration in the sense of personal identity and physical contact with space and time. For example, the user may feel as if he or she is floating, that time has stopped, or that the universe exists within. LSD consistently increases introspection and the focus on subjective experience. It decreases aggressiveness.

Mood shifts are common. Typically, users feel euphoric, but this feeling may change to an extreme sense of uneasiness, even panic. LSD usually reduces tension, but it may also increase anxiety. Sometimes users become paranoid and suspicious. Feelings of rapture and an enhanced sense of beauty can be replaced by terror and gloom, which can last for hours.

The distortion of time and space, combined with mood swings, can be hazardous. Judgment is impaired, and driving while under the influence of LSD is particularly dangerous. The drug's psychotic effects have occasionally lasted for days or months.

Tolerance for LSD develops quickly. Within three days of repeated doses, the user must increase the amount of LSD to feel its effects. However, the initial sensitivity to the drug returns if several days pass between doses.

As far as is known, LSD is not toxic and there is no permanent physical effect from its use. There are no physical dependence or withdrawal symptoms associated with long-term use, but psychological dependence can develop in some users. Some users may experience flashbacks, episodes in which earlier experiences with the drug are relived.

PCP (Phencyclidine)

PCP was originally developed as an anesthetic in 1956, but it was banned for human use in 1965 because of its severe and unpredictable side-effects, which range from distorted perceptions to disorientation to violent, psychotic behavior. The drug did come into widespread use as a large-animal tranquilizer and to fatten hogs for market, but is now illegal for any purpose, and its constituent chemicals are controlled substances.

By the 1970s, illegal PCP was being sold on the street as THC, the active ingredient in marijuana. Actual THC cannot be produced cheaply or stored efficiently, so PCP became the underground substitute. PCP can be made as a liquid, which can be injected, or a crystal, which can be inhaled or eaten. The drug can even be absorbed through the skin.

Most commonly, it is sprinkled on tobacco, parsley or marijuana and smoked. Ether is used in the manufacture of PCP, and the characteristic smell of the anesthetic is easy to identify.

PCP is also known by the following names:

- angel dust
- dust
- elephant tranquilizer
- tea
- cannabinol
- rocket fuel
- super kools

PCP's Effects

PCP affects a variety of brain functions. Like a stimulant drug, it increases chemical and electrical activity. Like a depressant, it dulls the neurons responsible for conducting pain impulses. Like a hallucinogen, it alters neural response to sensual stimuli. The effects can last from two to six hours after use.

PCP is very toxic. Even at low doses, the physiological effects of this drug include:

- high blood pressure
- lack of coordination
- irregular muscle functioning and rigidity
- little or no pain response
- loss of sensitivity to temperature
- fever accompanied by shivering
- nausea and vomiting

At high doses (above 10 milligrams), PCP can cause a sudden, severe drop in blood pressure, coma, convulsions and death.

PCP users can be extremely dangerous. Individuals can be very agitated and violent and often exhibit tremendous physical strength—a syndrome labeled "PCP rage." Emotional instability, hallucinations, paranoia and aggression are usual behavioral manifestations of PCP intoxication. Suicide and other forms of self-mutilation are common.

Like other hallucinogenic drugs, PCP does not cause physical dependence. Psychological dependence is common.

Inhalants

Inhalants are substances that are sniffed in order to produce intoxication, exhilaration and excitement. The list of inhalants is very long and includes products from adhesives to waxes to paints. These chemicals are essential to many legitimate functions, so it is almost impossible to control all of them.

Although many drugs, including nicotine, cocaine, PCP and marijuana, can be sniffed, inhalants belong to a different class of drugs. Inhalants are readily absorbed through the lungs and into the bloodstream. Once in the blood, they are quickly carried to the brain. Some inhalants uniquely affect tissues that are rich in lipids, or fats, such as the brain.

Inhalant use is very common. Experts estimate that more people use these substances as drugs than use heroin. Such use usually begins at an early age because inhalants are readily available, inexpensive and easily concealed.

Many products are used as inhalants, including:

- cleaning fluid (trichloroethylene)
- lacquer thinner (mixture of toluene, acetone and methanol)
- airplane glue (toluene)
- gasoline

All of these products produce fumes that when inhaled for any extended length of time will produce intoxication.

Inhalants' Effects

When a drug is inhaled, it moves directly from the lungs to the brain without passing through the liver or stomach. Therefore, inhaled drugs are not diluted or metabolized, and the effects are stronger than those produced by swallowed or injected substances. Some inhalants produce effects similar to sedative-hypnotic drugs, while others act as stimulants or have anti-anxiety effects.

Some of the effects can be attributed to *anoxia*, or lack of oxygen, resulting from the combination of holding one's breath and the body's absorption of high concentrations of carbon dioxide. Some of the effects of nitrous oxide, commonly called "laughing gas," are due to oxygen deprivation.

Generally, inhalants produce the following behavioral patterns:

- euphoria, or a carefree feeling in which everyday worries disappear
- hallucinations
- memory loss
- occasional aggressiveness

Repeated exposure can intensify these effects, and behaviors characteristic of psychosis can develop.

Inhalants can produce more toxic effects than many drugs. Some of the effects are reversible, but others are permanent, even lethal. Even very brief exposures can disrupt the normal function of the heart, sometimes causing death. A single exposure can disrupt normal brain activity and destroy brain cells.

Products used as inhalants are seldom pure. They contain various other chemicals that can affect the body. For example, while toluene is toxic to the nervous system only at high concentrations, it is commonly combined with benzene, a chemical that is known to cause cancer at low levels.

Inhalants can have very dangerous effects on the heart. Some cause irregular pumping actions, which can increase or decrease heart activity. Inhalants can overstimulate the heart, which increases blood pressure to dangerous levels. Conversely, inhalant use can depress the ability of the heart muscle to contract, which means the body will not receive an adequate supply of blood.

Inhalants can have toxic effects on other organs. The lining of the lungs can swell and make breathing difficult, even after drug use stops. Some inhalants damage the lining of the liver or cause blood vessels in the kidney to burst. Bone marrow can be damaged, and reproductive organs may be adversely affected.

The brain and the sensory nerves are very vulnerable to the toxic effects of inhalants. Blindness and the loss of high frequency hearing can result from long-term use. The senses of smell, taste and touch may also be damaged by inhalant use.

Some of these poisons, for example, those found in nail polish, some glues, paint thinner, varnish and shellac, are addictive. Users develop physiological dependence and tolerance and go through withdrawal when the drug is stopped.

Other inhalants cause severe psychological dependence, but no physiological addiction. Users repeatedly use the drug to feel its euphoric effects. Withdrawal symptoms can occur, but they do not have serious physical effects.

Finally, people who use inhalants can develop *sensitivity*, whereby relatively low concentrations of the drug are able to produce effects similar to those initially produced only in high concentrations. In effect, sensitivity is the opposite of tolerance; it greatly increases the danger of lethal overdose.

Marijuana

Marijuana is actually a form of *cannabis*, the general name given to the drug naturally present in the plant *Cannabis sativa*. The major ingredient in marijuana is delta-9-tetrahydrocannabinol, or THC. THC is a mild hallucinogen, but marijuana may also have sedative or stimulative effects. THC is found highly concentrated in the plant's resinous oil, but stems, seeds, flowers and leaves all contain the chemical.

Hashish, the pure resin, is the most potent form of cannabis. It appears as a hardened, darkened rock, which is chipped for smoking or eating. However, not many plants can be used to produce hashish.

Since most plants don't produce the pure resin, marijuana is more commonly prepared by chopping up the leaves and flowering tops of the plant. The marijuana can then be smoked, eaten or brewed as a tea and drunk. Potency varies according to what part of the plant is used and how it is ingested.

Other names for marijuana include:

- pot
- hash
- weed
- ghanja
- Mary Jane
- smoke
- reefer
- tea
- grass
- joints
- sinsemilla
- Thai sticks
- Colombian
- Acapulco Gold

Marijuana has been cultivated as a large cash crop for decades, and modern farming techniques have yielded stronger plants. According to the National Institute of Drug Abuse, the THC content of marijuana today may be 275% higher than ten years ago. Because most research on marijuana's effects was conducted when marijuana contained less THC, the drug's effects may be underestimated.

Marijuana's Effects

Marijuana slows the passage of electrical impulses in the brain by blocking receptors on cells that normally receive transmissions.

Much like small amounts of alcohol and other depressants, marijuana at common dosage levels causes:

- relaxation
- increased sensitivity to external stimuli
- drowsiness
- euphoria
- lowering of inhibitions
- relief of mild anxiety, although severe anxiety can be worsened by marijuana

Perceptions of space and time can become distorted. Short-term memory loss is common, as is loss of one's train of thought. Users have increased reaction time, which can be dangerous when combined with driving or other complex tasks.

The physical effects of this drug vary based on the level and length of use. Low, short-term doses cause:

- bloodshot eyes
- dry throat
- increased appetite
- increased thirst
- increased heart rate
- tightness of the chest
- dizziness when moving from a lying to standing position
- muscular discoordination

Toxicity is rare but does happen with sensitive individuals. Symptoms can include:

- nausea
- restlessness
- abnormal pupil dilation
- visual hallucinations
- delusions

Although used in lower amounts than tobacco, marijuana is more damaging to the respiratory system. Marijuana use decreases the body's ability to exchange oxygen and carbon dioxide in the lungs. It also increases the risk of cardiovascular disease in people who already have high blood pressure. Joints, or marijuana cigarettes, yield four times more tar than cigarettes, and tar is the biggest cause of smoking-related cancer.

Marijuana may also increase the user's susceptibility to respiratory infections. This effect may result from a general depression of immune response rather than direct action on the respiratory system. Males have lowered sperm counts as well as sperm with less *motility*, or ability to move. The drug may inhibit female ovulation.

Marijuana use does not lead to physical dependence, and there is no withdrawal syndrome associated with discontinuation of the drug. However, psychological dependence does occur in some individuals.

1-Minute Facts

- Drugs can be classified by the ways in which they affect thinking and behavior. Common classifications are stimulants, depressants, narcotics, hallucinogens and inhalants.
- Stimulants affect the central nervous system. They include caffeine, amphetamine and cocaine.
- Depressants tend to slow down certain body functions. They include barbiturates and alcohol.
- Narcotics act on the central nervous system to relieve pain and produce a sense of well-being. They include morphine, codeine and heroin.
- Hallucinogens alter the perception of everyday reality. They include LSD and PCP.
- Inhalants produce intoxication, exhilaration and excitement. These products are readily available, inexpensive and easily concealed.
- Marijuana interferes with communication among brain cells.

PREVENTION AND TREATMENT

MYTH: Children and youth are already educated about drugs.

Fact: Young people today do know more about drugs and their negative effects. But a lot of the information they have is incomplete, confusing or inaccurate.

An educated population of young people is an essential first step to preventing drug use. Young people will be educated about drugs only when they have the facts, including alternatives to drug behaviors, and the skills to make healthy decisions. They must be taught the truth about drugs and the risks associated with their use.

As with other educational efforts aimed at affecting behavior, information alone is not enough. Personal and social skills—communication, assertiveness, decision making, negotiation and evaluation—are important aspects of drug prevention. Young people who develop such skills early can practice and expand them into adulthood.

Schools should not be singled out as the only setting in which education can take place. Parents and other caregivers need to talk about drugs with their children. They need to establish themselves as sources of information and support and provide consistent, clear limits.

The media also play an educational role. Although television and print media have increased their coverage of drug problems and now run anti-drug advertising, many continue to accept cigarette and alcohol advertising. (Cigarette advertisements are illegal on radio and television.)

Mixed messages from society and the media confuse youth. Alcohol use offers a good example. Children and youth are bombarded with commercials that show drinking as an enjoyable, harmless activity that will make them happy and sophisticated.

School programs may offer the opposite picture, teaching that alcohol is a deadly poison that leads only to illness and degeneracy. Not only do young people find this less appealing than the media view, they know it isn't true. Most children and youth have seen their parents and friends drink without these dire consequences.

Drugs and the Law

Laws and their enforcement are an important aspect of drug prevention efforts. The U.S. government is empowered by the 1970 Federal Controlled Substance Act to control or minimize the availability of drugs. The substances covered by the law are categorized according to the following schedule:

- **Schedule I** drugs have a high potential for abuse, no current medical use and lead to severe physical dependence (e.g., heroin).
- **Schedule II** drugs have high abuse potential and can lead to severe physical and psychological dependence, but do have an accepted use in medical treatment (e.g., morphine, amphetamine).

- **Schedule III, IV and V** drugs do have medicinal uses and have progressively less potential for abuse (e.g., Valium is a Schedule IV drug because it has medical value, low abuse potential and a low level of dependence).

Individual states also have legal restrictions on drugs. The penalties for possession, use or distribution can vary.

Some experts suggest revamping the classification of drugs and the penalties prescribed by law. For example, LSD, marijuana and heroin are all currently Schedule I drugs, even though their pharmacology and range of effects are very different. Heroin has a much greater potential for dependency than either LSD or marijuana.

Treatment

The relatively small percentage of people who do abuse drugs cause disproportionate medical, social and financial burdens for all. In 1993, nearly a million drug-dependent people who had sought treatment could not find space in treatment centers. Getting treatment for these people could lead to substantial decreases in health care costs, crime, violence and lost productivity. Early treatment of drug use in pregnant women is especially valuable, as it can help improve the health of their newborn babies.

Different drugs require different treatment strategies, and what is necessary at one stage of recovery wouldn't be effective at another stage. Current intervention and treatment options include:

- detoxification
- residential programs
- outpatient programs

Treatment with other drugs is also an option.

- **Detoxification:** Drug withdrawal can be a serious health crisis. Detox centers, which may be associated with correctional facilities or hospitals, usually provide acute medical care to make the process safer and less painful, with fewer long-term side-effects.

  Psychotherapy is usually included in treatment. It is used to examine the underlying reasons that people use drugs. The length of stay varies. Addicts often return to detox centers several times during the course of their illness.

- **Residential programs:** Sometimes drug users require a highly structured, drug-free environment to begin the recovery process. Hospitals, community centers or private drug treatment centers can physically remove these users from the environment in which they took drugs.

  Since many drug users are in very poor health, these communities help rebuild nutrition and hygiene. Residential programs also offer intensive psychotherapy, job training and family support.

- **Outpatient programs:** Some drug dependence can be treated successfully without living away from home. Some drug users can get the support they need to maintain drug-free behavior by visiting the hospital for treatment and counseling. Others may attend Alcoholics Anonymous or Narcotics Anonymous meetings.

Drug Treatment

Many people who work with drug users are opposed to treating drug use with other drugs. They believe that only programs based on complete abstinence really succeed; otherwise, they argue, one drug is simply substituted for another.

Although stopping drug use completely is the goal, many people with addiction problems don't stop, even with treatment. Relapse rates are very high for the most troublesome drugs: alcohol, tobacco, cocaine and heroin.

The experience of withdrawal is the primary reason "cold turkey" programs don't work for everyone. Taking the drug away causes a violent physical reaction. Medications can lessen the amount of withdrawal an individual must suffer while stopping use of the drug. However, many addicts who get past the withdrawal period still relapse.

Sometimes other drugs can help beat addiction by blocking the high or making the person sick if they use the addicting drug. For example, if an alcoholic drinks after receiving the drug Antabuse, she or he becomes violently ill. For the drug to work, however, the alcoholic has to be committed to taking Antabuse every day. Other drugs now available completely eliminate the effects of both heroin and cocaine.

Other drugs mimic the effects of the abused drug but do not produce the same serious social or health risks. Methadone maintenance for heroin addiction is the best known example. Because it is taken orally instead of by injection, methadone does not increase the risk of heart disease, HIV infection or other needle-borne infections. Because it is given out under controlled conditions in clinics, its use does not contribute to street crime and doesn't require pushers.

Experts estimate one-fourth of America's heroin addicts have been helped by methadone. Millions would like to participate in treatment programs but there is no space.

Recently, drugs have been introduced to help people quit smoking. They are available as chewing gum or skin patches that emit nicotine and maintain circulating levels of the drug. Although nicotine itself can be harmful, the patches and gum are far safer than inhaling cigarette smoke. Gradually, the dosage can be lowered until the craving for nicotine disappears.

1-Minute Facts

- An educated population of young people is the first step to preventing drug use.
- Laws and their enforcement are another important aspect of drug prevention efforts.
- Current intervention and treatment options include detoxification, residential programs, outpatient programs and treatment with other drugs.

Glossary

A

addiction—Physical and psychological dependence on a drug; literally, describes the compulsive use of narcotics.

analgesic—A drug that relieves pain.

anoxia—Lack of oxygen.

antibiotic—Drug usually derived from molds and fungi that is used mainly to treat bacterial infection.

C

CDC—Centers for Disease Control and Prevention, a federal agency based in Atlanta, which studies and monitors the incidence and prevalence of diseases in the United States; also provides health and safety guidelines for the prevention of disease.

cilia—Tiny hair-like projections that line certain parts of the body, such as the respiratory tract. Their constant motion helps sweep away foreign particles and prevent pathogens from entering the body.

crack—An inexpensive form of smokable cocaine, obtained by treating cocaine with baking soda and water.

crank—Amphetamine.

D

disease—A particular destructive process in an organ or organism with a specific cause and characteristic symptoms.

E

edema—The condition resulting from collection of fluid in connective tissue.

F

freebase—A drug created when cocaine hydrochloride, a salt, is neutralized with a high-yielding solvent such as ether to extract the pure drug, which is then dried and smoked.

H

hallucination—The apparent perception of sights, sounds, etc., that are not actually present.

I

inflammation—A response of the body to infection or injury characterized by redness, swelling, fever and pain.

intravenous—"Within veins"; injection by needles directly into the veins.

M

medicine—A drug given for the purpose of treatment or prevention of disease or for diagnosis.

motility—The ability of mature sperm to swim on their own.

N

neurologic—Pertaining to the nervous system or brain.

neurons—Cells that transmit and receive chemical signals that affect body function, thought, feelings and behavior; brain cells.

neurotransmitter—Chemical messengers that allow communication between nervous system cells.

P

physical dependence—A physiological change in cellular function induced by use of a drug, which may be accompanied by tolerance and causes withdrawal symptoms when drug use ends.

proof—Twice the percentage alcohol by volume contained in an alcoholic beverage.

psychedelic—Causing extreme changes in the conscious mind, including auditory or visual effects.

psychoactive—Acting on the brain; drugs that cause changes in brain function, which affects mood and behavior.

psychological dependence—A condition in which an individual is convinced that he or she needs to feel the effects of a drug and may experience withdrawal symptoms when the drug is discontinued.

psychosis—A mental illness in which contact with reality is severely impaired by such symptoms as delusions, hallucinations and bizarre behaviors.

R

risk—The likelihood of injury, damage or other negative consequences following an action.

S

sedative—A class of drugs that depress the nervous system and thereby lessen anxiety and promote sleep.

stimulant—A class of drugs that excite brain cells and cause increased chemical activity.

synapse—The communication gap between two neurons.

synergism—A multiplier effect; can refer to compounded risks or use of drugs.

systemic—Affecting the entire organism or bodily system.

T

tolerance—Physiological adaptation to a drug, which results in the need for increased dosage to achieve the previous effect.

tranquilizer—A class of drugs that decreases the feelings and behaviors associated with anxiety.

Resources

Al-Anon Family Group
P.O. Box 862
Midtown Station
New York, NY 10018
212-302-7240
For meeting and Alateen information: 800-443-4525

Alcohol Abuse Emergency 24-Hour Hotline
800-ALC-OHOL

Alcoholics Anonymous
General Service Office
P.O. Box 459
New York, NY 10163
212-870-3400

American Alliance for Health, Physical Education, Recreation and Dance
1900 Association Dr.
Reston, VA 22091
703-476-3400

American Association of Sex Educators, Counselors and Therapists
435 N. Michigan Ave., Suite 1717
Chicago, IL 60611
312-644-0828

American Heart Association
7272 Greenville Ave.
Dallas, TX 75231
800-242-1793

American Medical Association
Department of Health Education
515 N. State St.
Chicago, IL 60610
312-464-5000
Customer service: 800-621-8335

American Pharmaceutical Association
2215 Constitution Ave. NW
Washington, DC 20037
202-628-4410

American Psychiatric Association
1400 K St. NW
Washington, DC 20005
202-682-6000

American Psychological Association
750 First St. NE
Washington, DC 20002
202-336-5500

American Public Health Association
1015 Fifteenth St. NW
Washington, DC 20005
202-789-5600

American School Health Association
P.O. Box 708
Kent, OH 44240
216-678-1601

American Social Health Association
P.O. Box 13827
Research Triangle Park, NC 27709
919-361-2742

Centers for Disease Control and Prevention (CDC)
1600 Clinton Rd. NE
Atlanta, GA 30333
404-639-3311

Clearinghouse on Health Indexes
Division of Analysis
Office of Analysis and Epidemiology
National Center for Health Statistics
Centers for Disease Control and Prevention
6525 Belcrest Rd., Room 790
Hyattsville, MD 20782
301-436-7035

March of Dimes, Birth Defects Foundation
Public Health Education Department
1275 Mamaroneck Ave.
White Plains, NY 10605
914-428-7100

National Clearinghouse for Alcohol and Drug Information
P.O. Box 2345
Rockville, MD 20847
301-468-2600
800-SAY-NO-TO (English and Spanish)

National Clearinghouse for Maternal and Child Health
8201 Greensboro Dr., Suite 600
McLean, VA 22102
703-821-8955, ext. 254 or 265

National Council on Alcoholism and Drug Dependence Hotline
800-475-HOPE

National Health Information Center
Office of Disease Prevention and Health Promotion
P.O. Box 1133
Washington, DC 20013
800-336-4797

National Institute on Drug Abuse (NIDA) Hotline
800-662-HELP
800-66-AYUDA (Spanish)

National Self-Help Clearinghouse
25 W. 43rd St., Room 620
New York, NY 10036
212-354-8525

Parents' Resource Institute for Drug Education (PRIDE)
800-677-7433

U.S. Public Health Service
Office of Communication
News Division
Hubert H. Humphrey Building, Room 717H
200 Independence Ave. SW
Washington, DC 20024
202-245-6867

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